

State of California
The Resources Agency
Department of Fish and Game

**RECOVERY STRATEGY FOR
CALIFORNIA COHO SALMON**
Report to the California Fish and
Game Commission

Prepared by
The California Department of Fish and Game

Species Recovery Plan Report 2003-1

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Implementation

Several hundred statewide and watershed-specific recommendations for recovering coho salmon in California are listed in Chapter 6 (Range-wide Recommendations), Chapter 7 (Watershed Recommendations), and Chapter 8 (Shasta-Scott Pilot Program). To successfully implement these recommendations, watersheds within the coho salmon range should be prioritized. In addition, several elements must be identified for each task: a) level of priority; b) responsible party(ies) or organization(s); c) estimated initiation and duration of implementation; and d) estimated cost. These topics are covered in this chapter, to the extent that the information is available.

As described in Chapter 7, this recovery strategy mainly uses two watershed designations from the CALWATER 2.2a system (Appendix E), the *hydrologic unit* (HU), which generally corresponds to major watersheds or sub-regions, and within each HU by *hydrologic subarea* (HSA), which generally corresponds to major tributary watersheds. In a few cases, the *hydrologic area* (HA), a unit intermediate in scale between the HU and the HAS, is used. For purposes of implementation priorities, rankings were only developed at the HSA level.

10.1 PRIORITIZATION OF WATERSHEDS

The recovery strategy incorporates a three-tiered process to prioritize watersheds for coho salmon recovery. This approach: 1) identifies for maintenance and recovery those watersheds supporting the best coho salmon populations in California and identifies those coho salmon populations that are currently at risk of extinction; 2) provides a ranking system for guiding recovery planning actions among watersheds; and 3) identifies those watersheds having barriers to migration that could be corrected with ease, relative to other solutions. This process was developed from a review of data available for coho salmon and their watersheds throughout California, as well as discussions with the CRT. The maps below are intended to guide recovery-planning actions. Appendix F describes how the maps were developed and defines terms used in the following discussion. *The maps, and criteria used to develop them,*

should be considered general guidelines for watershed recovery planning and restoration actions rather than absolute.¹

10.1.1 GENERAL PRINCIPLES

In HSAs considered refugia for coho salmon, the recovery strategy will include actions that preserve, protect, and enhance these best remaining populations and their habitats. These HSAs, identified on Figure 10-1 (Consistent presence of coho salmon in the SONCC ESU) and Figure 10-2 (Consistent presence of coho salmon in the CCC ESU), are top priorities for Department resources and other resources available for habitat restoration.

Each population of coho salmon potentially represents unique genetic and life history attributes. Some populations of coho salmon are at greater risk of extinction than others, particularly those in the central coast of California. Identifying these populations will enable resource managers and others to guide actions to avoid extinction and begin recovery. HSAs in which populations of coho salmon are at risk of extinction, identified in Figure 10-3 (SONCC ESU) and Figure 10-4 (CCC ESU), will receive special consideration for maintenance and recovery actions.

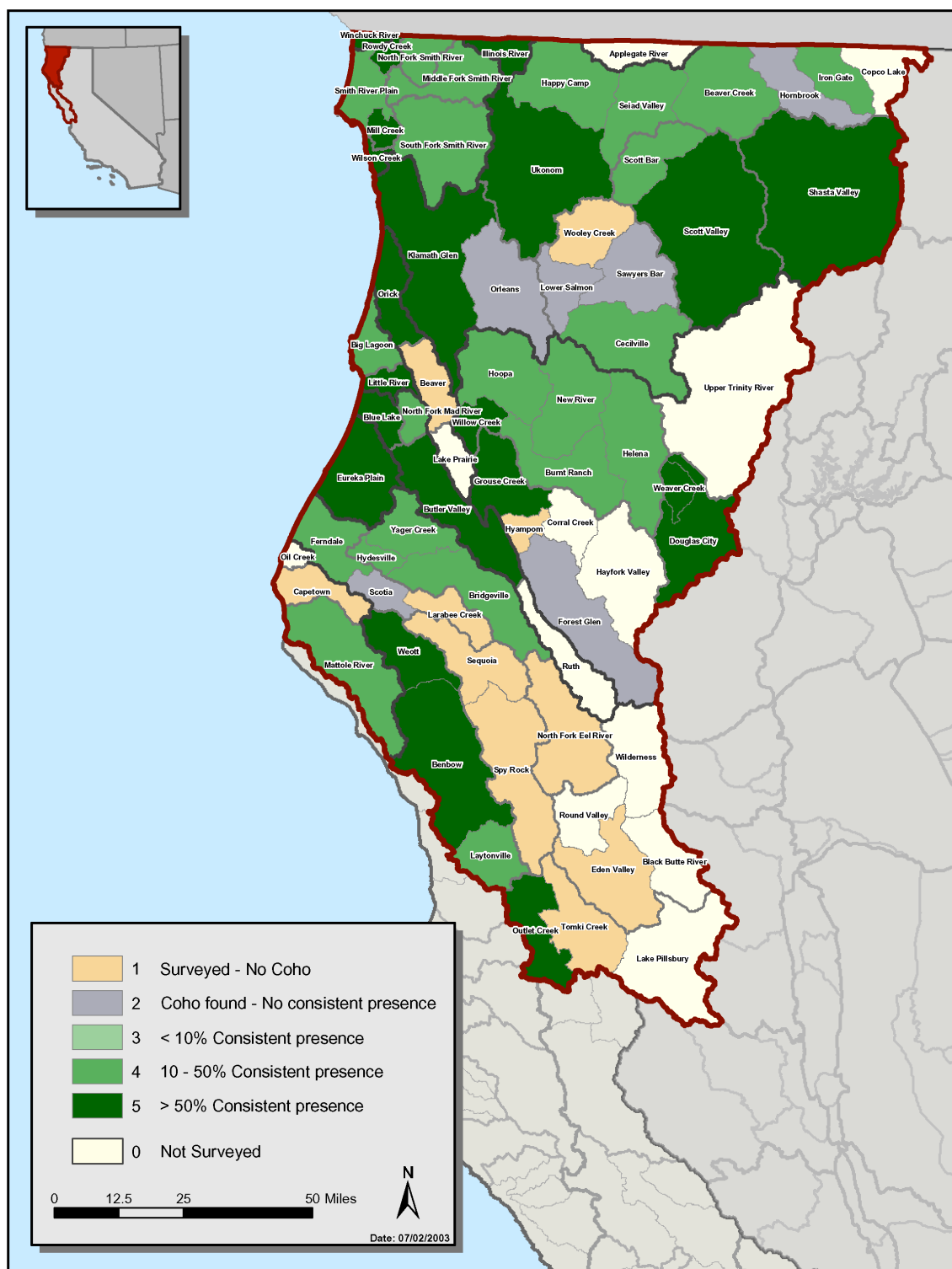
Ranking of HSAs relative to their potential for coho salmon recovery is intended to guide recovery strategy actions that may improve habitat within these watersheds. This ranking incorporated information on coho salmon populations, HSA condition, and risks to salmon within these HSAs. HSAs scoring higher in this ranking should be given priority in the expenditure resources or resources available for restoration, other considerations being equal. HSA rankings for maintenance and recovery actions are presented for the SONCC ESU (Figure 10-5) and the CCC ESU (10-6).

Recovery strategy actions in HSAs with barriers to migration will include providing passage for both juvenile and adult coho salmon. The distribution of barriers is illustrated in Figure 10-7 (Disconnected habitats in the SONCC ESU) and Figure 10-8 (Disconnected habitats in the CCC ESU). These HSAs should be viewed as cost-effective opportunities to provide increased habitat, relative to other recovery strategy actions.

The databases used to generate the maps and support this prioritization should be updated periodically, perhaps at 3- to 5-year intervals. This would allow review and modification, if warranted, of the HSA rankings.

¹ Some situations may over-ride or alter recommended priorities. Examples include, but are not limited to, willing landowners, high cost-shares, unique funding opportunities or partnerships, multi-species projects, etc. Cost effectiveness must be considered regardless of priorities.

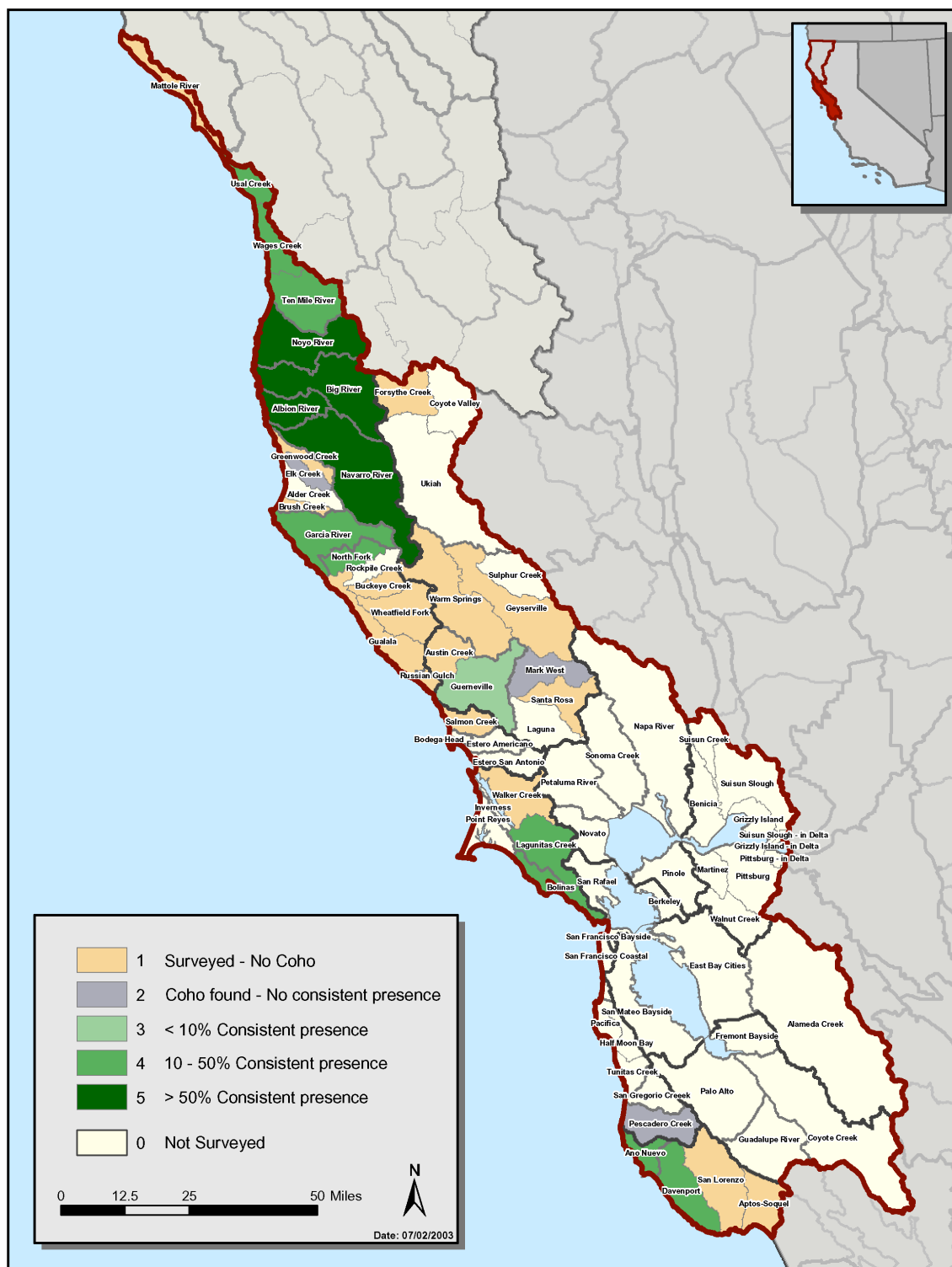
FIGURE 10-1: Consistent presence of coho salmon in the SONCC ESU



Note: Refugia watersheds have consistent presence >50%.

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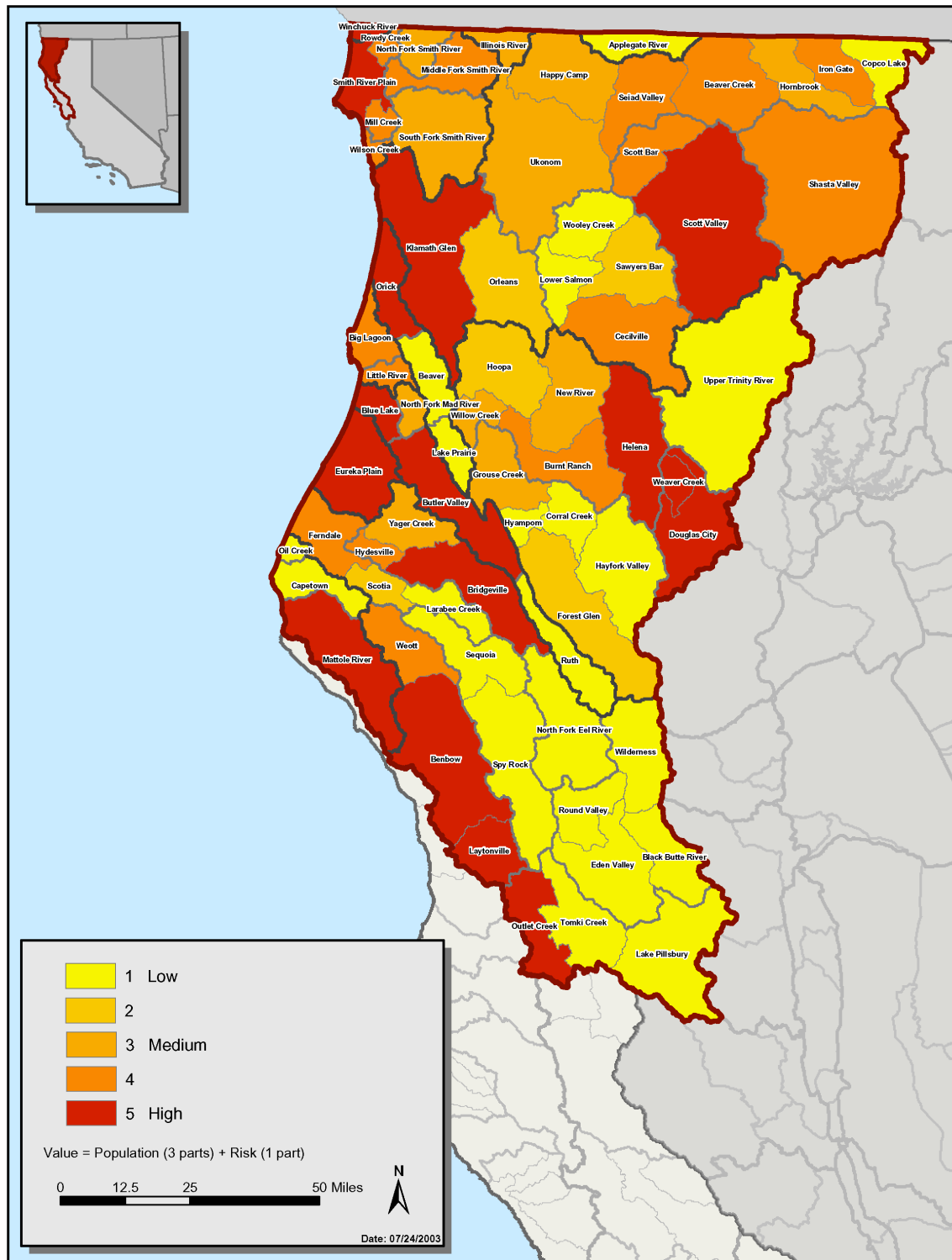
FIGURE 10-2: Consistent presence of coho salmon in the CCC ESU



Note: Refugia watersheds have consistent presence >10%.

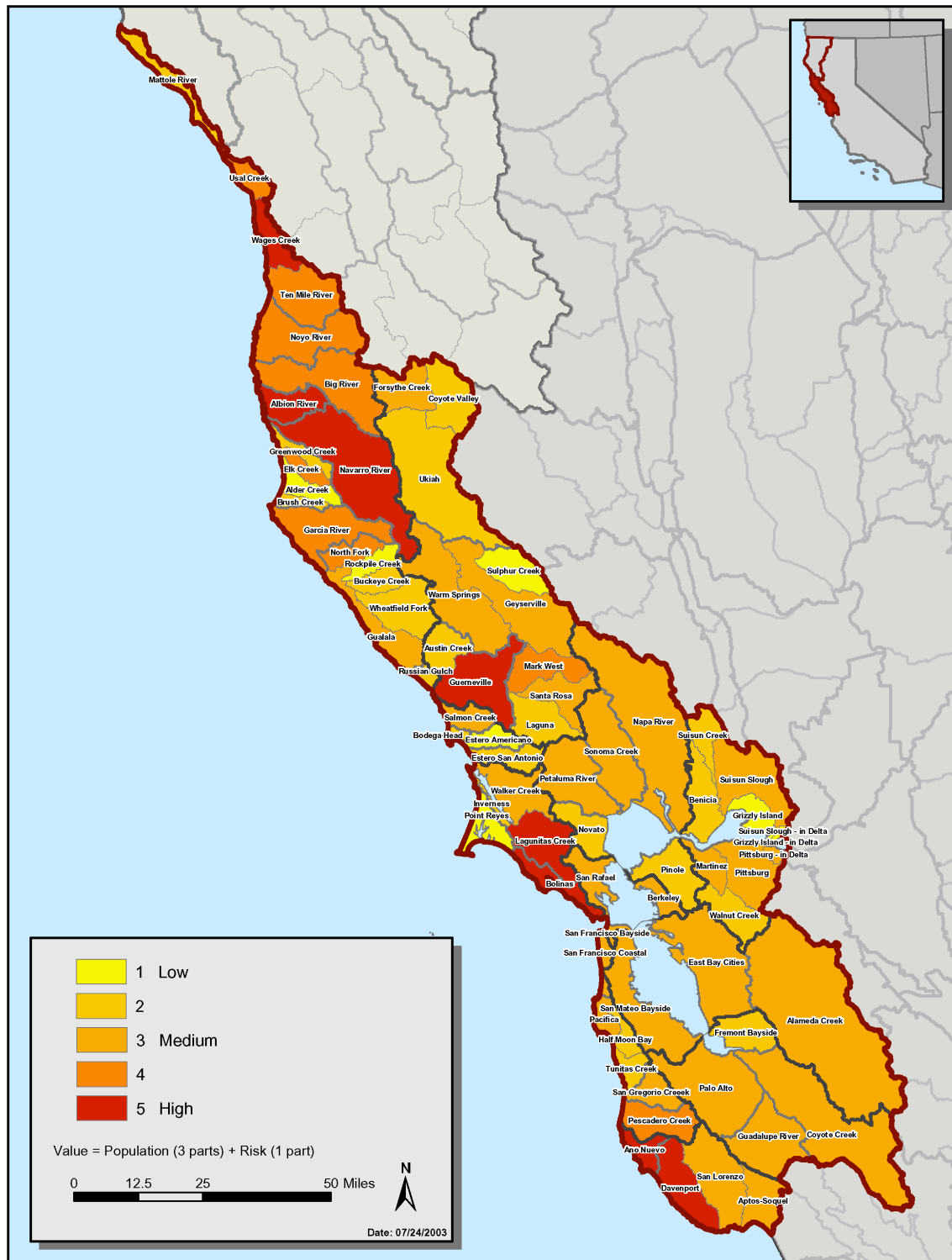
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FIGURE 10-3: Risk of extinction in watersheds of the SONCC ESU



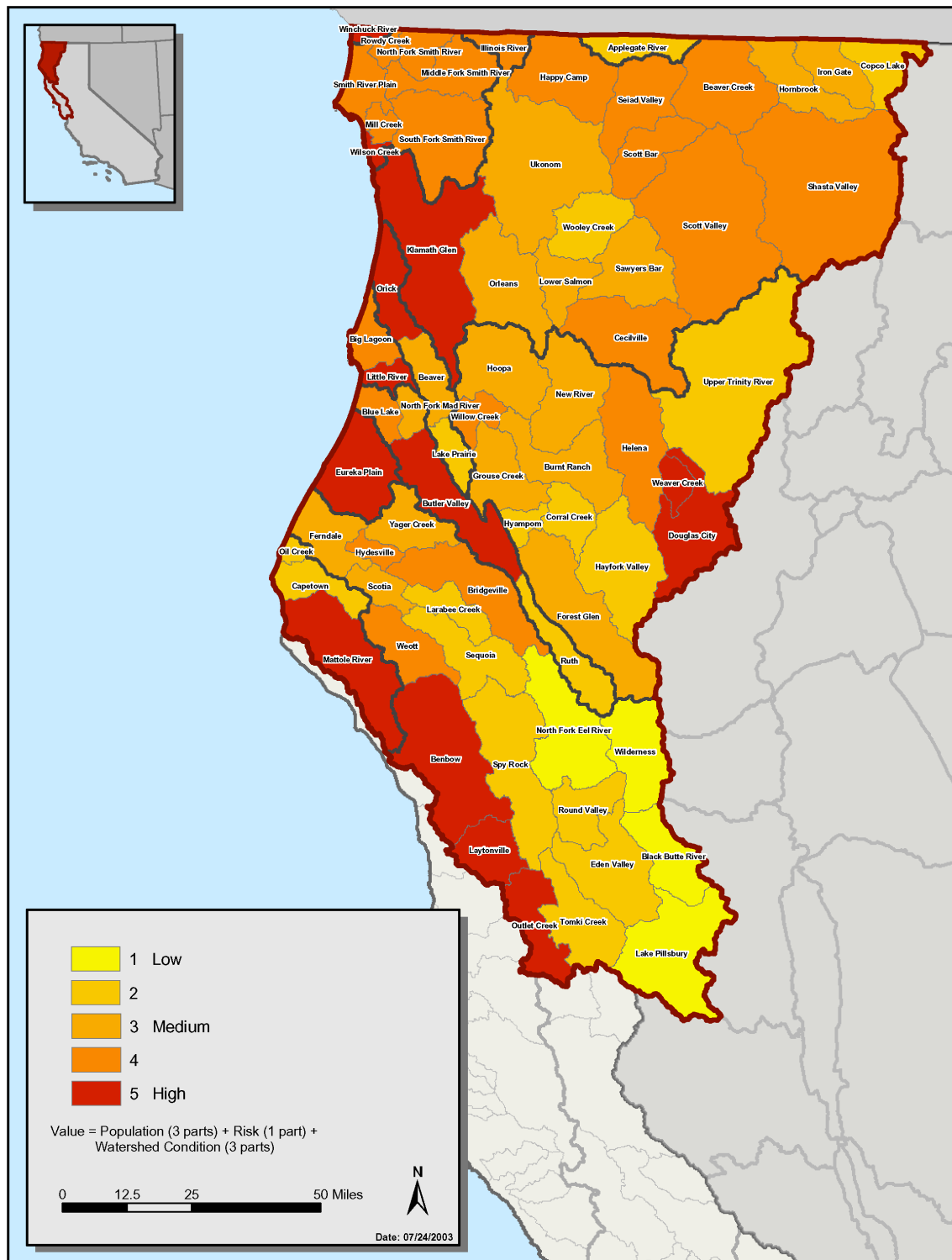
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FIGURE 10-4: Risk of extinction in watersheds of the CCC ESU



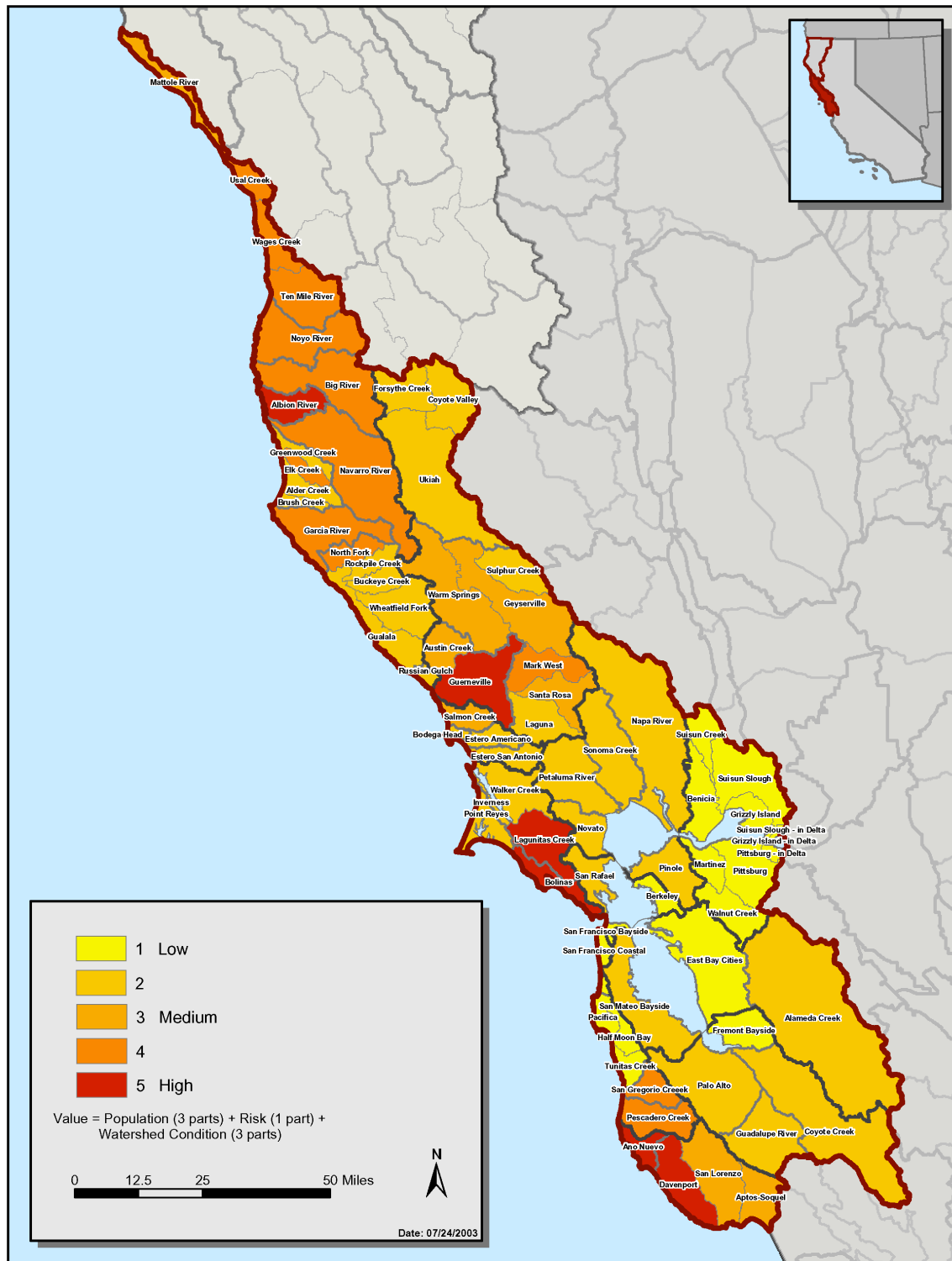
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FIGURE 10-5: Restoration and management potential in the SONCC ESU



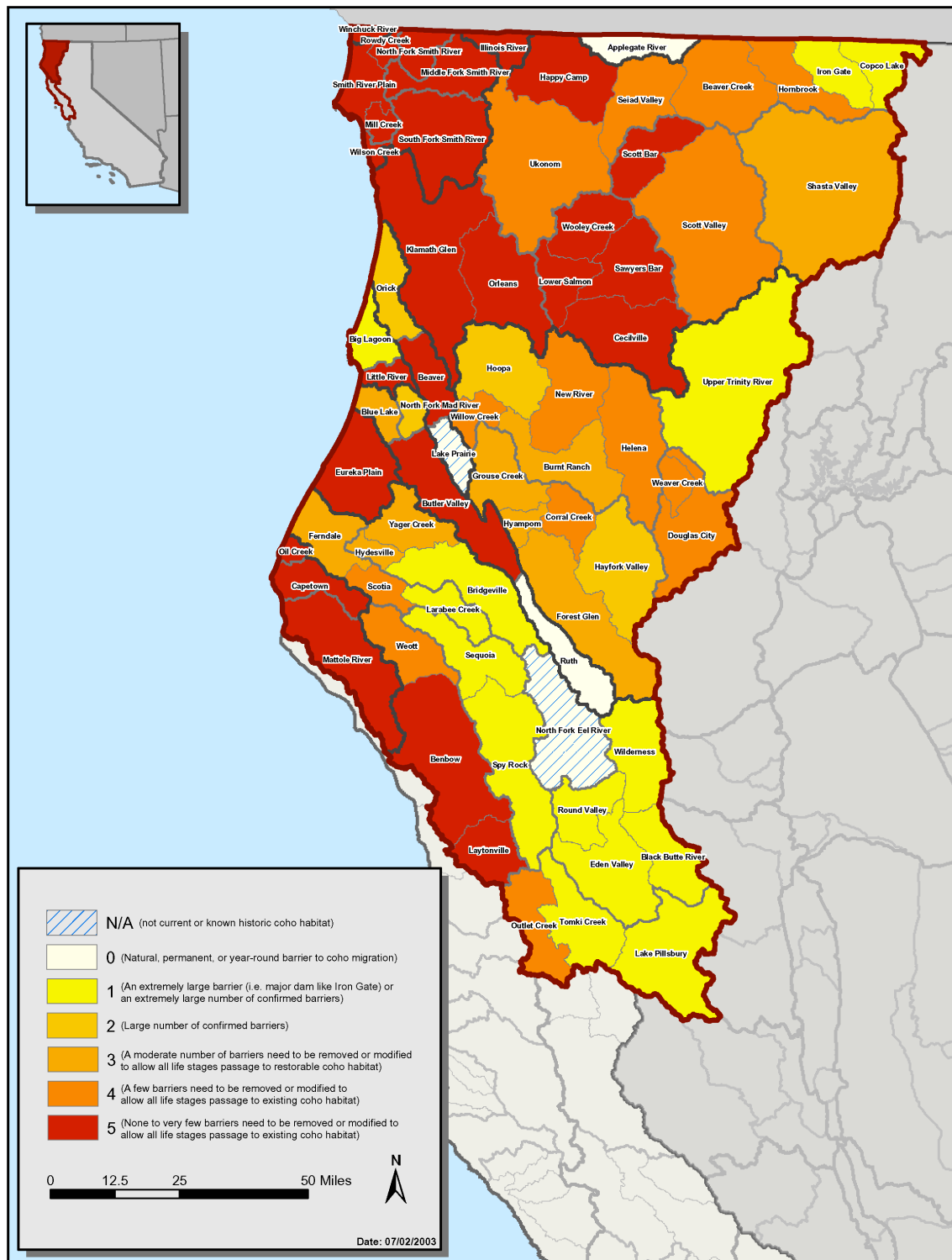
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FIGURE 10-6: Restoration and management potential in the CCC ESU



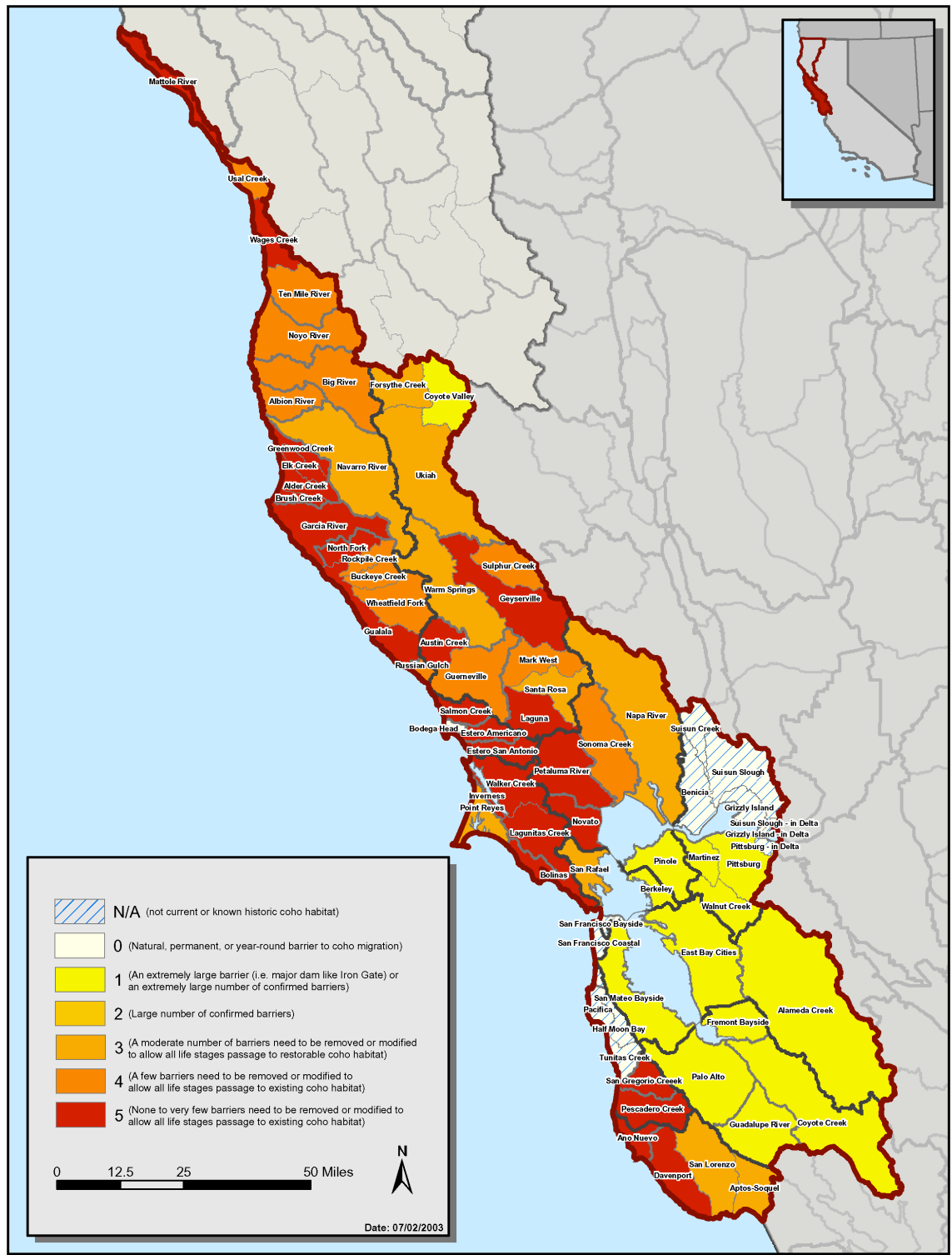
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FIGURE 10-7: Disconnected habitat in the SONCC ESU



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FIGURE 10-8: Disconnected habitat in the CCC ESU



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Finally, the prioritization criteria proposed is for recovery of coho salmon, as per CESA and FGC, and may or may not apply to other salmonid species such as Chinook salmon, steelhead, and coastal cutthroat trout.

10.1.2 PRIORITIZATION PROCESS

The three steps followed to prioritize the watersheds are described in this section.

10.1.2.1 Identify Refugia Watersheds (Figures 10-1 and 10-2) and Risk of Extinction (Figures 10-3 and 10-4)

Rationale: Those HSAs in the SONC ESU with consistent presence of > 50% should be considered refugia watersheds. HSAs in the Central California Coast ESU having consistent presence of > 10% should also be considered refugia watersheds. However, even these watersheds have problems that could reduce productivity and these problems should be addressed.

Risk of extinction to coho salmon is ranked on watershed risks and coho population parameters, since coho salmon population abundance and genetic data are not available statewide. The ranking combines risk (human density, water diversions, road density) and population parameters (consistent presence of coho salmon, isolation index for coho salmon populations, and run length of coho salmon populations). Those HSAs in which risk of extinction is high should be given equal priority as refugia watersheds.

Anticipated Actions:

- i. On public lands, consider full maintenance and recovery of instream and riparian areas.
- ii. On private lands, provide incentives for riparian maintenance and recovery strategy activities that maintain and enhance coho salmon habitat.
- iii. Identify any problems within these watersheds and recommend actions (for example; restoring estuarine habitats in Eureka Plain, Redwood Creek and Smith River).
- iv. Prioritize biological refugia watersheds in the application of California coho statewide recommendations.

10.1.2.2 Identify Restoration Potential (Figures 10-5 and 10-6)

Rationale: HSAs with high scores for recovery strategy actions are known to support populations of coho salmon and have potential habitat that has been compromised. Coho salmon populations in HSAs ranking high (4-5) in the combined population, risk and habitat potential categories should have potential to respond when restoration actions are taken.

Anticipated Action:

- i. Determine if near-term (< 9 years) actions are adequate to maintain these populations at their current level.
- ii. Determine if near-term and long-term actions will allow for expansion of these populations in all brood-years.
- iii. If identified recovery strategy actions satisfy categories (b,i) and (b,ii) above, use the prioritize scheme to guide watershed restoration and other identified recovery strategy actions. If identified recovery strategy actions do not satisfy categories (b,i) and (b,ii) above, then recommendations *must* be upgraded.
- iv. Develop recommendations specific enough to direct restoration actions.
- v. Work with existing watershed groups in priority HSAs and landowners who are willing to work on watershed assessments to develop specific actions to restore coho habitat.

10.1.2.3 Identify Disconnected Habitats (Figures 10-7 and 10-8)

Rationale: Eliminating barriers to migration is among the most effective restoration actions that can be taken. Barriers to migration limit the distribution of coho salmon and limit recovery potential. Removing barriers, including but not limited to those created by federal, state, county or private road culverts, rail crossings, tide gates and small impoundments are high priorities. Addressing levees for flood control, access over larger impoundments, or other hydraulic or thermal barriers may present greater challenges, but must also be considered important components of disconnected habitats.

Anticipated Actions:

- i. Identify and map the specific locations of barriers and score barriers using two criteria: 1) the amount of coho salmon habitat made accessible by their removal and 2) the relative ease or cost of their removal (culverts, tide gates and small impoundments = 3, levees and large impoundments = 2, thermal and hydraulic barriers, and other barriers requiring sites-specific evaluation = 1).
- ii. Where appropriate, implement existing recommendations that are specific enough to direct barrier elimination.
- iii. Develop additional, needed recommendations for barrier elimination.

10.2 IMPLEMENTATION SCHEDULE AND COSTS

The timing and duration required for recovery was given in Chapter 9 (Timeframe and Economics of Recovery). This chapter identifies estimated time for each recovery recommendation. Some recovery actions are already occurring (*ongoing*). But most actions are yet to be initiated. Some of those actions can commence immediately or within the first five years of the strategy (*interim*), while others require other actions to occur before they, themselves, can be undertaken (*long-term*).

Some actions will be immediate and temporary (*short-term*), while others will continue indefinitely and at constant intervals (*continual*).

TABLE 10-1: Implementation Schedule

PRIORITY	TASK #	TASK DESCRIPTION	RESPONSIBLE PARTY	ESTIMATED TIME	ESTIMATED COST

10.3 FEASIBILITY

The recovery strategy and implementation schedule must be capable of being carried out in a scientifically, technologically, and economically reasonable and legal manner. Therefore, all of the processes and activities within this strategy are subject to these considerations.

10.4 AVAILABILITY OF FUNDS

Implementation of the recovery strategy by the Department is subject to the availability of adequate funding and staffing resources. It is also subject to the availability of adequate funds of other responsible parties and participants to support and implement recovery strategy actions.

10.5 RESPONSIBLE PARTIES

Many parties and organizations are either responsible for recovery actions or will be instrumental in recovery of coho salmon in California. These include, but are not limited to:

Federal agencies:

- National Marine Fisheries Service (NOAA Fisheries)
- United States Forest Service (USFS)
- National Park Service (NPS)
- Bureau of Reclamation (BOR)
- United States Fish and Wildlife Service (USFWS)

State agencies:

- California Department of Fish and Game (DFG)
- California Department of Forestry and Fire Protection (CDF)
- California Department of Parks and Recreation (DPR)
- State Water Quality Control Board (SWQCB)
- California Department of Transportation (CalTrans)
- Board of Forestry and Fire Protection (BOF)

County governments
City governments
Tribal governments
Private industry (including forestry, agriculture, livestock, mining)
Private landowners
Conservation organization
Watershed councils and groups
Academic institutions